

REMARKS

Claims 1, 3-7, 9 and 12-16 are all the claims pending in the application. Claim 16 is withdrawn from consideration as being directed to a non-elected invention. Claims 2, 10-11 have been canceled.

Claims 1-7 and 9-15 were rejected under 35 U.S.C. §103(a) as being unpatentable over Onomura (U.S. Pat. No. 6,067,309) in view of Takatani (JP 10-303504).

Applicants respectfully traverse.

Claim 1 is the only independent claim. Claim 1 recites, in part, that the positive-electrode-metal-containing layer has a thickness of 1 to 8 nm.

The Examiner contends that the claimed thickness of the positive-electrode-metal-containing layer is too broad, and that the data of Table 1 of the present application does not show criticality of the claimed thickness range. *See* Office Action, at page 9, third full paragraph.

Applicants respectfully disagree.

Table 1 of the present application is reproduced below. In particular, the data of Table 1 clearly shows that the difference in the positive-electrode-metal-containing layer thickness results in a difference in forward voltage. The difference in the forward voltage is important and significant, as discussed below.

Table 1

Thickness of Positive-electrode-metal-containing layer nm	Forward Voltage V
0.1	4
1	3.3
5	3.2
8	3.3
10	3.6

A forward voltage is a voltage applied between a positive electrode and a negative electrode of a light-emitting device, when a current of 20 mA flows through the light-emitting device. In other words, the forward voltage is proportional to the electrical resistance of the light-emitting device.

As shown in Table 1, the forward voltage is 3.2 V to 3.3 V when the positive-electrode-metal-containing layer has a thickness of 1 to 8 nm at the endpoints of the claimed range, while the forward voltage rises to 3.6 V when the positive-electrode-metal-containing layer has a thickness of 10 nm. Accordingly, when the positive-electrode-metal-containing layer has a thickness of 10 nm just over the claimed upper limit of 8 nm, the light-emitting device has a 10% larger resistance than that having a positive-electrode-metal-containing layer within the claimed thickness range. Similarly, when the positive-electrode-metal-containing layer has a thickness of 0.1 nm just below the claimed lower limit of 1 nm, the light-emitting device has a 20% larger resistance.

Typically, a constant voltage is applied to a light-emitting device to emit light. If a light-emitting device has a 10% larger resistance, a current flowing through the device decreases by 10%, whereby a light-emitting output decreases by 10%. Therefore, a light-emitting device

having a 10% larger forward voltage exhibits a 10% lower light-emitting output by applying the same voltage, and thus is less efficient.

Those of ordinary skill in the art would understand that 10% improvement in light-emitting output is very significant. In addition, according to the present invention, when the positive-electrode-metal-containing layer has a thickness of 1 to 8 nm, the forward voltage is kept within a very narrow range, i.e., 3.2 to 3.3 V. This means that output variation among light-emitting devices is very small. Such light-emitting devices can be used in production of a display having uniform brightness.

Thus, a difference of 0.3 V in the forward voltage when the thickness the positive-electrode-metal-containing layer increases from 8 nm to 10 nm is very significant. In addition, a constant and stable forward voltage of 3.2 to 3.3 V obtained within the instantly claimed thickness range is also very significant, and particularly advantageous for use in a display.

It is respectfully submitted that the thickness range of 1 to 8 nm of the positive-electrode-metal-containing layer is a critical feature of the present invention, which feature is not taught, suggested or otherwise recognized by Onomura in view of Takatani.

In view of the above, Applicants respectfully submit that the present claims are patentable over Onomura in view of Takatani, withdrawal of the foregoing rejection under 35 U.S.C. § 103 and rejoinder of withdrawn method claim 16 is respectfully requested.


Reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

RESPONSE UNDER 37 C.F.R. § 1.116
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Respectfully submitted,



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